

USER CASE: RESOURCE FOR MAKING TEXT BASED INSTRUCTIONAL CONTENT MATERIALS EQUITABLY ACCESSIBLE FOR ALL STUDENTS

Abstract: The resource for making text based instructional content materials equitably accessible for all students is provided throughout the learning environment to enable malleable text in activities requiring comprehending text and in activities requiring communicating with text to afford a universal literacy environment. The recommended specifications for this resource based in the evidence are:

1. text-to-speech with customizable:
 - a. highlighting by word, sentence, phrase, paragraph or any combination with customized contrast in foreground and background
 - b. hypertext - embedded prompts in text, audio, or voice format
 - c. transitions from the research/reading process to the writing/publication process
2. word processing with integrated and customizable text-to-speech, word prediction, word study tools, prompts and graphics, research tools, graphic organizers, and notation tools
3. scan-to-read functionality whether the working with text or image and whether the origin is paper-based, computer-based, or web-based
4. an integrated environment taking the user from the research and reading process through the writing process supporting the user to build foundational user competencies with the tools throughout the literacy continuum.

Need: The most common barrier for students in the learning process is attaining a level of reading fluency and reading comprehension that supports their ability to complete all elements of the writing process in all content areas, with efficiency. Comprehending text and communicating with text are primary functions in the learning process whether the text is in a paper based, computer based, or web based format. A number of student differences (e.g. socio-economic, cultural, disability related) may challenge the fluent development of these two functions. Remediation efforts are appropriate to address a student specific difference, but while addressing individual differences, the student also requires equitable access to instruction using text based materials to fully participate in and benefit from the general education curriculum. This need is not limited to a specific student population, but is a universal concern throughout all schools. Thus, it is necessary in all instructional settings to provide a universal literacy environment with equitable access to text based instructional content materials for all students.

What is required:

The resource that meets the need enables:

1. Use by all students and teachers throughout the instructional environment allowing for variation in user preferences
 - a. Measurement standard: 7 Principles of Universal Design
http://www.ncsu.edu/ncsu/design/cud/pubs_p/docs/poster.pdf
 - b. Evidence base: Universally designing a built environment (whether it be a school building, classroom, curriculum, or the policies and resources guiding the implementation of a 1:1 program) provides a more efficient and effective environment for all users. (Mace, Hardie, Place, 1991).
2. Malleable text to support a universal literacy environment
 - a. Evidence based: "A universal literacy environment is a digital reading environment that provides the learner with a variety of embedded features that are designed to support individual learning needs, while being sensitive to the interactive nature of the reading process." (Dalton, B., & Proctor, C. P., 2007,p.1).
3. Instructional design across all content areas to provide flexible means of representation with text based reading materials, flexible means of action and expression with text based writing activities, and flexible means of engagement in the universal literacy environment

4. Measurement standard: 3 Principles of Universal Design for Learning
<http://www.udlcenter.org/aboutudl/whatisudl/3principles>
5. Evidence base: Instructional design (e.g. curriculum, instructional materials, lesson planning, and assessment) must connect with students through three learning pathways (recognition, action and expression, and engagement). Rose, D. & Meyer, A. (2002).

Recommended Resource Specifications:

1. Interactive reading environment
 - a. Definition: Interactive reading environment provides additional functionality with text-to-speech for customizable:
 - i. highlighting by word, sentence, phrase, paragraph or any combination with customized contrast in foreground and background
 - ii. hypertext - embedded prompts in text, audio, or voice format
 - iii. transitions from the research/reading process to the writing/publication process
 - b. Evidence base: Text-to-speech software with embedded study aides increases reading fluency and comprehension when provided within an environment taking the student from the research/reading process to the writing/publication process. (Strangman, N and Dalton, B., 2005).
2. Interactive writing environment
 - a. Definition: An interactive writing environment offers tools to support all stages of the writing process from ideation, organization to drafting through to editing, revising and then to publication. Common tools utilized in digitized interactive writing environments are text-to-speech, word prediction, word study tools, prompts and graphics, research tools, graphic organizers, and notation tools.
 - b. Evidence base: Text-to-speech, word processing, and word study tools improve writing for struggling writers when used in environments that support students progression through the writing process. (Sitko, M. C., Laine, C. J., and Sitko, C. J., 2005).
3. Device agnostic and platform neutral scan-to-read
 - a. Definition: Scan-to-read is the ability of the software to take the text from any source, recognize it, and make it completely malleable for the user to apply tools the software provides, aligned with user preferences. Device agnostic and platform neutral scan-to-read means that the software is not purchased with limitations in use to a specific device.
 - b. Evidence base: Electronic text is malleable making it an immediate advantage to readers, but electronic text only reaches the potential as an assistive technology when provided in an electronic reading environment that intelligently transforms text into something that supports comprehension and extends meaningful learning. (Anderson-Inman, L., Horney, M., 2007)
4. Tools are delivered in an integrated environment seamlessly transitioning from the reading/research to the writing/publication process
 - a. Definition: An integrated environment is one that maintains the user in one consistent environment to build foundational user competencies in the learning process. Once developed, these foundational user competencies support the user to generalize these skills into other environments using similar tools.
 - b. Evidence base: There are four categories of user competencies necessary for successful assistive technology implementation: operational, functional, strategic, and social. Simply stated, operational competencies are those that support the user to operate the technology; functional competencies are those that allow the user to use the technology in a purposeful manner; strategic competencies are those that allow the user to use the technology in real world situations where events are not always predictable or reliable; and social competencies are those that make the user effective with the technology to achieve the targeted objective typically occurring within a social environment (e.g. classroom). (Zabala, J.; Bowser, G; Korsten, J., 2005 based on Light, J.,1989)

References:

- Anderson-Inman, L., Horney, M.(2007). Supported eText: Assistive technology through text transformations. *Reading Research Quarterly*. 42, 1, pp.153-160.
- Dalton, B., & Proctor, C. P. (2007). Reading as thinking: Integrating strategy instruction in a universally designed digital literacy environment. In D. S. McNamara (Ed.), *Reading comprehension strategies: Theories, interventions, and technologies* (pp. 421-439). Mahwah, NJ: Lawrence Erlbaum Assoc Inc. Retrived March 29, 2015 from http://www.udlcenter.org/sites/udlcenter.org/files/ReadingAsThinking_0.pdf
- Light, J. (1989). Toward a definition of communicative competence for individuals using augmentative and alternative communication systems. *Augmentative and Alternative Communication*, p. 137-143
- Mace, R. L.; Hardie, G. J.; Place, J. P. (1991). Accessible Environments: Toward Universal Design. The Center for Universal Design, North Carolina State University. Retrieved March 27, 2015 from http://www.ncsu.edu/ncsu/design/cud/pubs_p/docs/ACC%20Environments.pdf
- Rose, D. & Meyer, A. (2002). What brain research tells us about learner differences. Chapter 2 in, *Teaching Every Student in the Digital Age: Universal Design for Learning*. Alexandria, VA: Association for Supervision and Curriculum Development. Retrieved March 29, 2015 from <http://www.ascd.org/publications/books/101042/chapters/What-Brain-Research-Tells-Us-About-Learner-Differences.aspx>
- Sitko, M. C., Laine, C. J., and Sitko, C. J.(2005). Writing tools: Technology and strategies for struggling writers. A chapter in, *Handbook of Special Education Technology Research and Practice*. Eds. Edyburn, D.; Higgins, K; and Boone, R. Whitefish Bay, WI
- Strangman, N and Dalton, B. (2005). Using technology to support struggling readers: A review of the research. A chapter in, *Handbook of Special Education Technology Research and Practice*. Eds. Edyburn, D.; Higgins, K; and Boone, R. Whitefish Bay, WI
- Williams, S.C. (2002). How speech-feedback and word-prediction software can help students write. *Teaching Exceptional Children*, 34(3), 72-78.
- Zabala, J.; Bowser, G; Korsten, J. (2005). SETT & Re-SETT: Concepts of AT Implementation. *Closing the Gap* 23 [5]. Retrieved March 28, 2015 from http://www.joyzabala.com/uploads/Zabala_CTG_SETT_and_ReSETT_.pdf